Advanced Component Technology Program

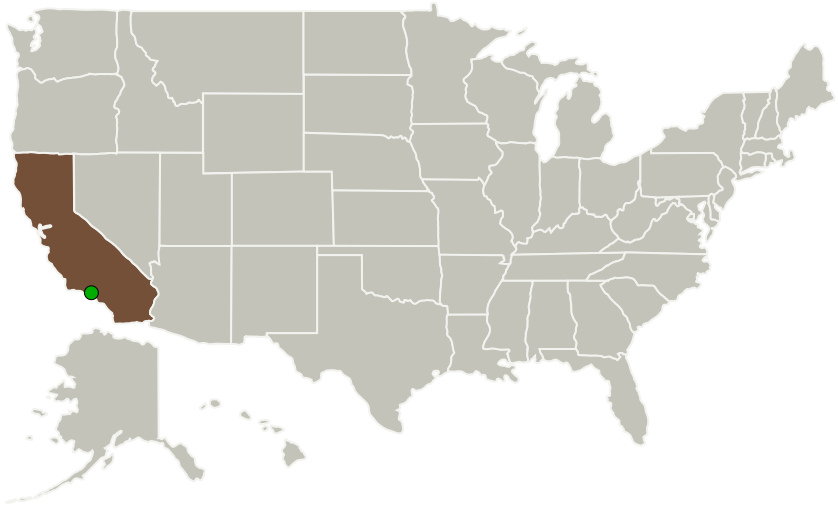
Planar Metasurface Reconfigurable W-band Antenna for Beam Steering

Completed Technology Project (2018 - 2020)

Project Introduction

In general, radar and radiometer instruments for Earth Science measurements need a scanning antenna capability. Mechanical conical scanning is suitable for certain applications, but not cloud and precipitation vertical profiling. At W-band technologies to achieve electronic scanning are being developed but require a phased array feed + reflector solution which is not well suited for very small platforms where it is necessary to launch with a stowed configuration and deploy in space. We propose to develop Planar Metasurface Reconfigurable Antenna with electronic beam Steering capability (PMRSA). PMRSA do not require the use of a feed at the focal point; they are compact and flat, the feed point is in the middle of a very thin planar surface. They are therefore ideally shaped for panel-folding in Cubesats. For proof-of-concept demonstration, we will design and develop a W-band PMRSA and show its scanning capabilities over a wide range of scanning angles.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
California Institute of Technology(CalTech)	Lead Organization	Academia	Pasadena, California
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

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Organizational Responsibility

Responsible Mission Directorate:

Science Mission Directorate (SMD)

Lead Organization:

California Institute of Technology (CalTech)

Responsible Program:

Advanced Component Technology Program

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Primary U.S. Work Locations
California

Project Management

Program Director:

Pamela S Millar

Program Manager:

Amber E Emory

Principal Investigator:

Nacer E Chahat

Co-Investigators:

Adrian J Tang
Karen R Piggee
Choon Sup Lee
Goutam Chattopadhyay

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.4 Microwave, Millimeter-, and Submillimeter-Waves

Target Destination

Earth